

REMARKS:

The preceding claim amendments and the following remarks are submitted as a full and complete response to the Office Action issued on July 9, 2007. Applicants respectfully request entry of the new claims 44 and 45 and favorable reconsideration of the application.

Claim rejections under 35 USC 102

Claims 16 to 18, 21 to 23, 25 to 27, 29, 32 to 33, and 39 to 41 have been rejected as being anticipated by Voie et al.

The Examiner maintains that Voie et al would disclose at least one illumination beam path along the x-axis and at least one detection beam path along the z-axis, characterized in that each illumination beam path is provided with a cylindrical lens as focussing arrangement, for producing an object illumination region which extends in the direction of an illumination beam path on the x-axis. The Examiner further maintains that this would also be a linear object region extending in the direction of the light beam path along the x-axis and transversely thereto along the y-axis. The Examiner further maintains that Voie et al. disclose a detection direction of the at least one detection beam path along the z-axis that is approximately orthogonal to the object illumination region and the object to be studied, and that the object is mounted to a holder the holder being movable within the sample chamber.

Claim 16 claims a linear object illumination area extending linearly in the direction of the illumination axis of the illumination beam path.

The Examiner further states in the response to arguments that the illumination region shown in Fig. 1 of Voie et al. would be considered linear at least when looking perpendicular to the y- and z-axes or the x- and z- axes.

The applicant respectfully disagrees. It is obvious for geometrical reasons that only a linear dimension of any planar object is visible if the planar object is viewed in its plane. However, this is a pure illustrative measure that depends only on the viewing angle and does not affect the three dimensional structure and extension of the object.

Moreover, it is shown and explicitly stated in Fig. 1 of Voie et al. that the illumination region is an “illumination plane” and thus has a two dimensional extension. The illumination region of Voie et al is therefore planar and not linear. Voie et al further describes on page 230, left col., line 7 - 9 that “the illumination beam is focused into a plane with a cylindrical lens and aligned to be co-planar with...”. Voie et al. further describes that “planar illumination” is employed to “obtain 2-D data” (page 230, left col., line 12 to 16).

The applicant has amended claims 16 to explicitly recite, that the linear object illumination region is essentially limited to one direction. Voie et al. does not disclose or teach any linear object illumination region limited to one direction.

Claim 16 is therefore patentable over Voie et al.. As claim 16 is patentable, dependent claims 17 to 23 are patentable, too.

Claim 25 has been amended to now recite that holder is “movable within a sample chamber, such that the mobile arrangement can produce a displacement movement of the object within the sample chamber.” This feature is disclosed in originally filed claim 2 and in previously filed claim 26.

This feature has been deleted from previously filed claim 26 accordingly.

Voie et al. discloses a rotation shaft oriented in the y-axis direction (page 232, right column, section specimen holder), while the illumination axis is oriented along the x-axis and the imaging axis is oriented along the z-axis (Figs. 1 and 2). Voie et al. further describes that the

sample can be positioned by translating a specimen holder along the three coordinate axes (page 232, right column, section specimen holder) forming a chamber. The whole chamber is mounted on a stage for moving the object and the chamber with respect to the illumination beam and the imaging axis. Thus, the object and the chamber can only be moved within the boundaries determined by the surrounding optical elements.

Voie et al. does not suggest a translational movement within the sample chamber. In this way, the chamber can remain fixed with respect to the illumination light beam and with respect to the detection direction allowing the focussing arrangement to be in close proximity or even contact with the chamber wherein, in the same time, the object can be displaced with the chamber. Thus, the focussing arrangement and other optical element can be positioned closer to the object thereby improving the optical properties of the microscope.

Claims 44 and 45 have been inserted claiming that the microscopes of claim 25 and claim 1, respectively, that “the mobile arrangement provides at least one rotational axis being substantially perpendicular to said illumination axis and substantially perpendicular to said detection direction.”

The feature of the rotational axis being substantially perpendicular to said illumination axis and to said detection direction is described in Fig. 1 and Fig 2 showing two perpendicular schematic views of the same microscope as indicated by arrow II in Fig.1 and arrow I in Fig. 2. Fig. 2 clearly illustrates that the rotational axis 14 is perpendicular to the direction 9 illumination axis. The detection direction 10 is perpendicular to the plane of projection of Fig. 2 but shown in Fig. 1. The rotational axis 14 in Fig. 1 is perpendicular to the plane of projection and therefore not shown in this figure. It is further disclosed in section [0049] of the published application that

“the holder makes it possible to rotate the sample about its vertical axis 14, so that the sample can be illuminated and viewed from several sides”.

Claim rejections under 35 USC 103

Claim 1-3, 5, 8-10, 15, 34, 42-43 are rejected as being unpatentable over Voie et al in view of Van Eijk et al.

The Examiner maintains that Voie et al does not disclose a holder being configured so that the holder/mobile arrangement can be rotated around an axis corresponding essentially to the gravitational direction. The Examiner also maintains that van Eijk et al. teaches an object holder which can be rotated around an axis corresponding essentially to the gravitational direction and refers to claim 8.

The applicant respectfully disagrees. The disclosure of van Eijk et al relates to an optical lithographic device (column 1, line 20-21) movable in orthogonal X-, Y- and Z- axes. Firstly, the skilled person in the field of microscopy would not consider the disclosure of van Eijk to be relevant to the field of microscopy as claimed in the current application. Optical Lithography involves imaging a mask onto a substrate which have to be aligned with respect to each other, whereas the current invention involves the 3-dimensional observation of biological samples from different angles. The skilled person who is interested in observing biological samples in 3-dimensions would simply not look into remote fields such as optical lithography. The designer of a microscope and the designer of an optical lithographic device are two different people.

Secondly, even if the skilled person were to consider this disclosure, it is described in van Eijk et al that a first support is rotatable about the Z-axis with respect to a second support (column 1, line 13 to 16 and claim 8). However, no direction of gravity is indicated or mentioned in claim 8 or elsewhere in van Eijk et al. It is in particular not disclosed in van Eijk et al. that the

Z-axis is oriented in a particular direction. In contrast, the device disclosed of van Eijk et al. is used in optical lithographic for imaging a mask 343 on a semiconductor substrate 349 (col 13, line 59 to col 14, line 3). There is no limitation why the lithographic device should be orientated in a particular direction and thus there is no hint for an orientation of the Z-axis in the direction of gravity in van Eijk. Claim 1 is therefore patentable in view of Eijk et al.

In addition, the lithographic device described in van Eijk et al. has an illumination light beam along the Z-axis for illuminating the mask 343 (Fig. 5). For imaging the mask 343 light has to transmit the mask and has to be imaged at the opposite site of the mask. Therefore, the incoming light beam, the mask 343 and the imaging light beam and substrate 349 have to be arranged on a single optical axis coinciding with the same Z-axis (column 3, line 28-33). In lithographic methods, the imaging light beam can not be orthogonal to the mask illumination light beam because any lithographical method relays by definition on light transmission rather than on reflective or fluorescent light.

Furthermore, the lithographic device described in van Eijk et al. provides rotation of the illumination mask 343 only about the Z-axis, the illumination axis and the imaging axis. A rotation about any other axis is not disclosed in van Eijk et al.


In contrast the microscope of the present invention relates to a microscope for imaging or detecting light being reflected or emitted by the probe. Therefore, the illumination light beam is oriented substantially orthogonal to the detection light beam. No transmission light is detected in the present invention. Therefore, the applicant submits that the disclosure of van Eijk et al is not relevant to the current application and even if the disclosure were relevant it is substantially different from the microscope of the present invention.

The applicant is of the opinion that the objections of the Examiner are now moot and considers the present set of claims being in a patentable form.

In the event that this paper is not considered to be timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fee for such an extension together with additional fees that may be due with respect to this paper, may be charged to Counsel's Deposit Account No. 02-2135.

In light of the foregoing, Applicants submit that all outstanding rejections have been overcome, and the instant application is in condition for allowance. Thus, Applicants respectfully request early allowance of the instant application. The Commissioner is hereby authorized to charge any fees or credit any overpayment to Deposit Account No. 02-2135.

Respectfully submitted,

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